

# (12) UK Patent Application (19) GB (11) 2 304 093 (13) A

(43) Date of A Publication 12.03.1997

(21) Application No 9615866.2

(22) Date of Filing 29.07.1996

(30) Priority Data  
(31) 07205882 (32) 11.08.1995 (33) JP

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(51) INT CL<sup>6</sup>  
B65H 37/04

(52) UK CL (Edition O)  
B8F F5  
U1S S1855

(56) Documents Cited  
WO 93/09050 A1 US 4818329 A US 3935758 A

(58) Field of Search  
UK CL (Edition O) B8F  
INT CL<sup>6</sup> B65H 35/07 37/04  
ONLINE:WPI

## (54) Tape application jig

(57) A jig for applying adhesive tape 13 to an elongate surface of a workpiece 17 comprises a pair of engaging means 15, 18 and 24, 34 for slidably co-operating with the workpiece to guide the jig therealong in use and a guide portion 12 to guide the tape through the jig, the tape-engaging surface of the guide portion 12 including a raised, deformable, central part 14 to press the tape 13 against the workpiece 17. The engaging means may comprise a movable jaw 24, 34 biased by springs 33 and claw members 18 adjustably held on end block 15 by bolts 19. The guide portion 12 and part 14 may be coated with low friction material 11. The jig may be held manually by a handle portion 36. The tape 13 may be peeled from a base sheet 41 for application to the workpiece 17 such as a vehicle door sash.

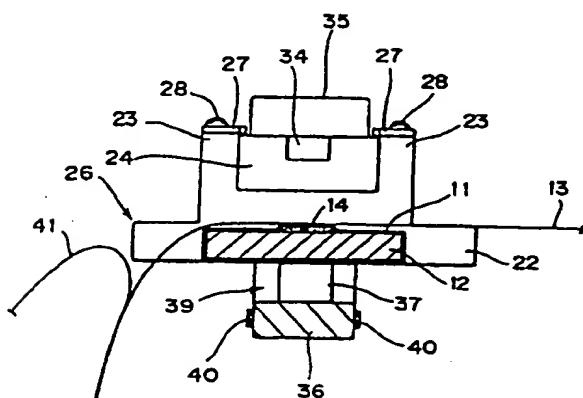


FIG. 5

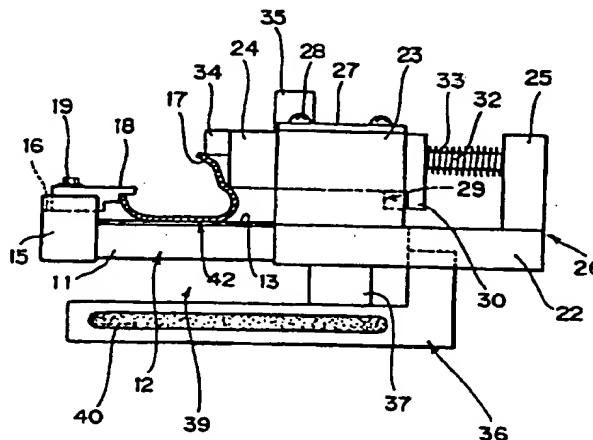


FIG. 7

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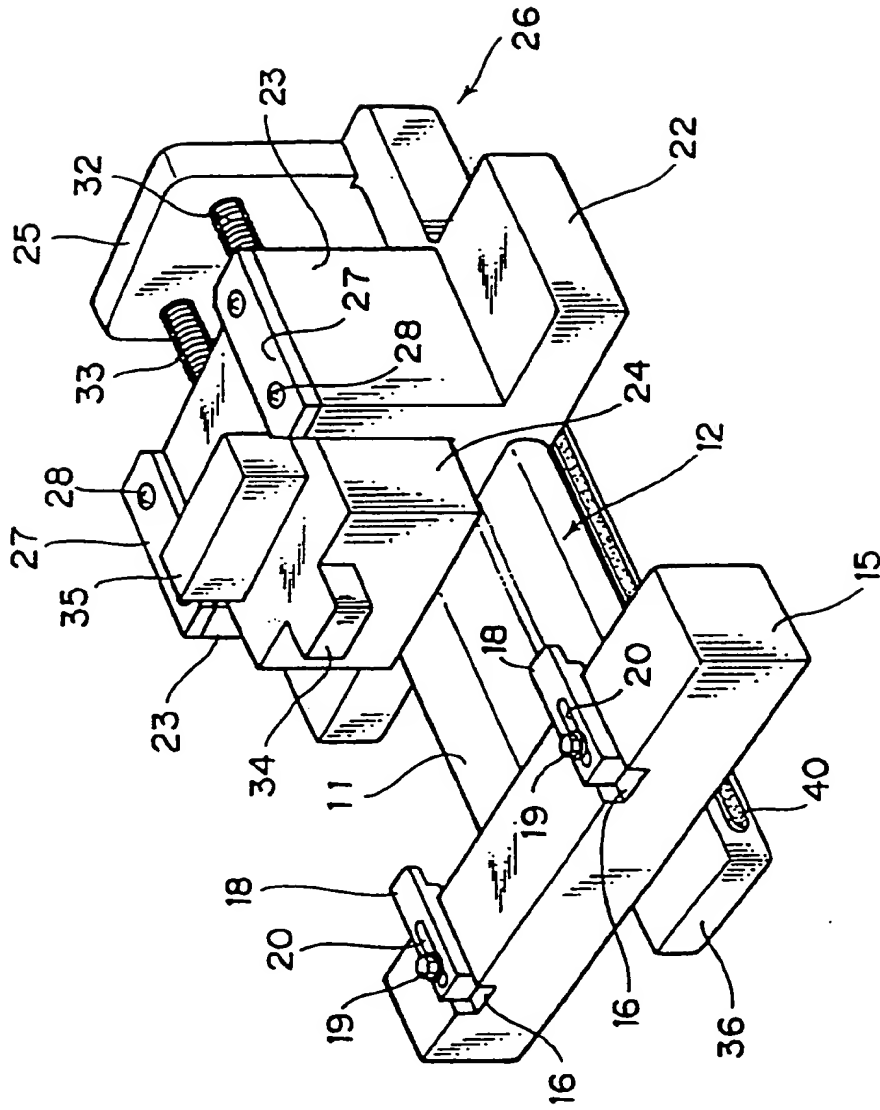


FIG. 1

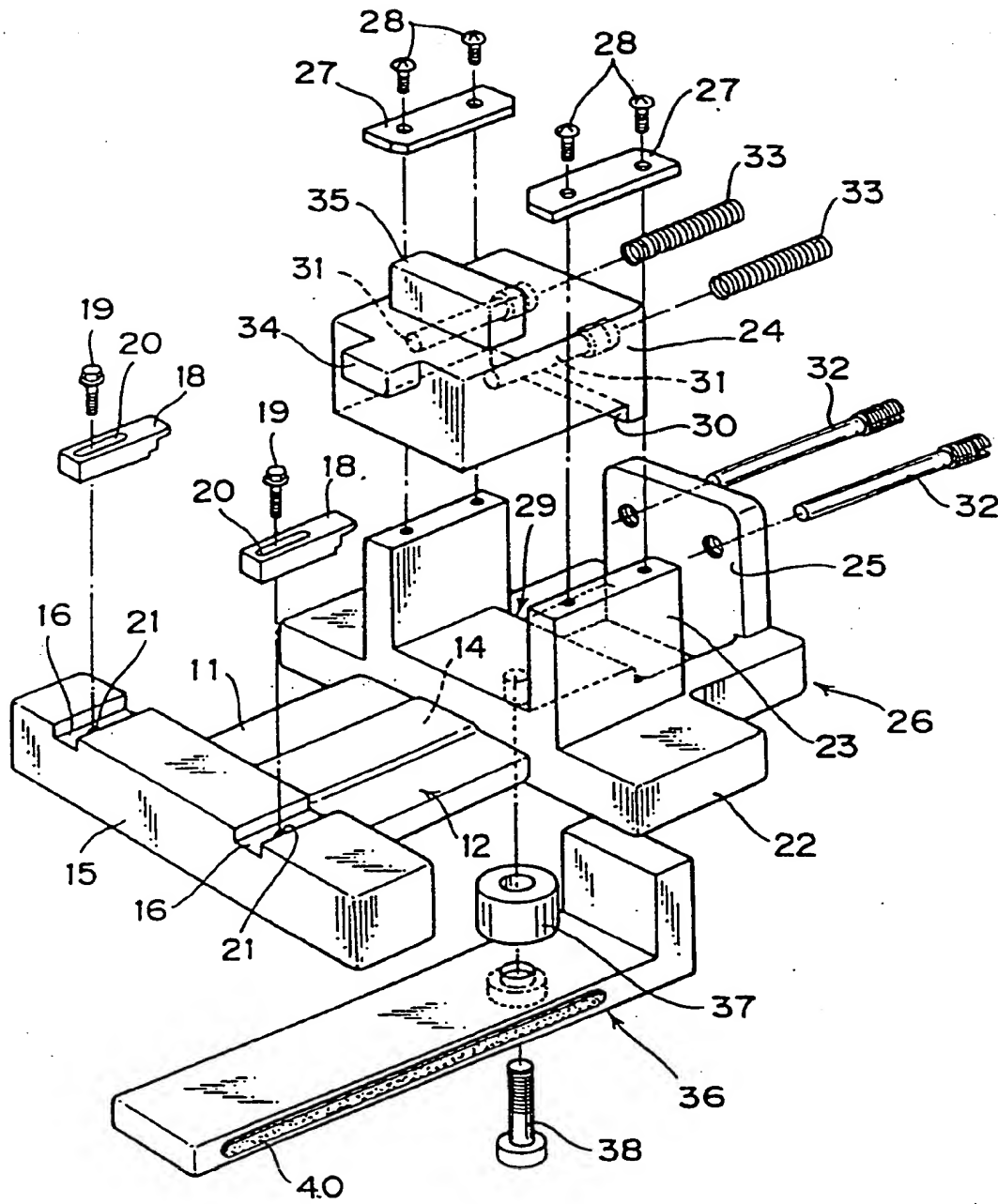


FIG.2

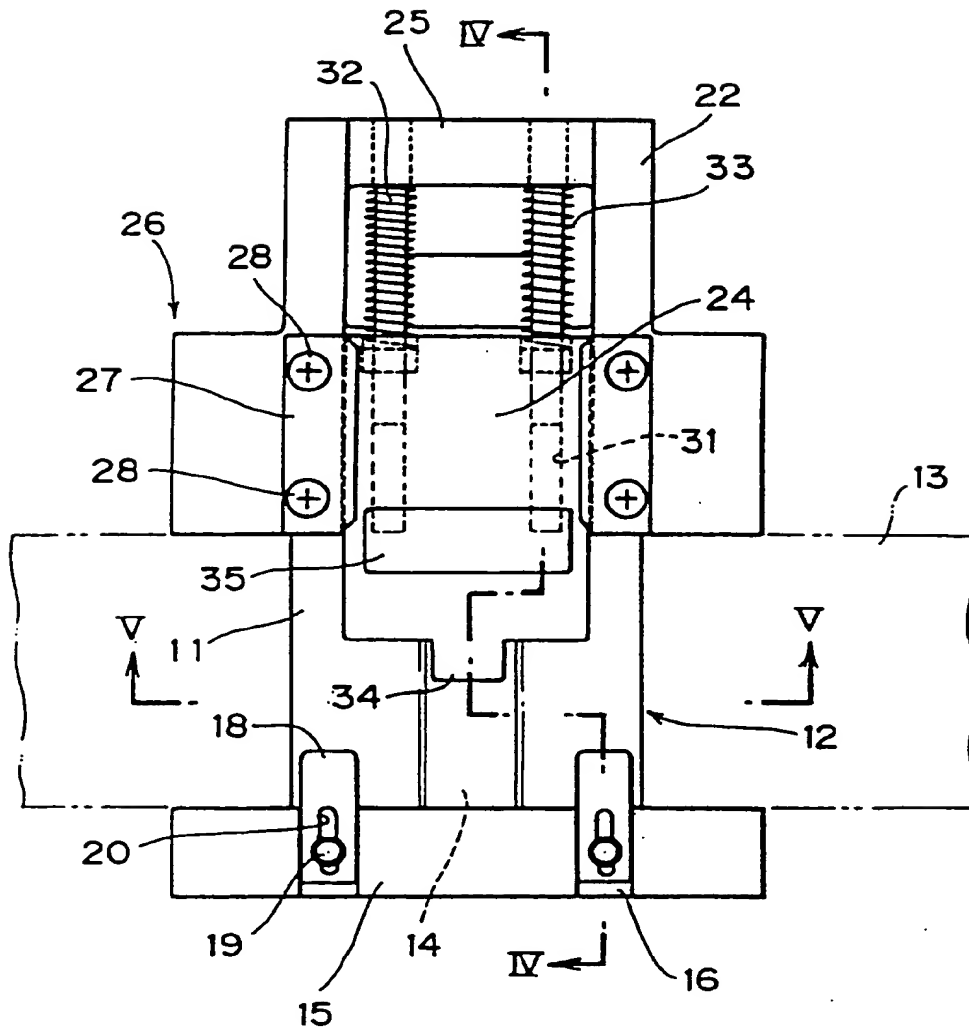


FIG. 3

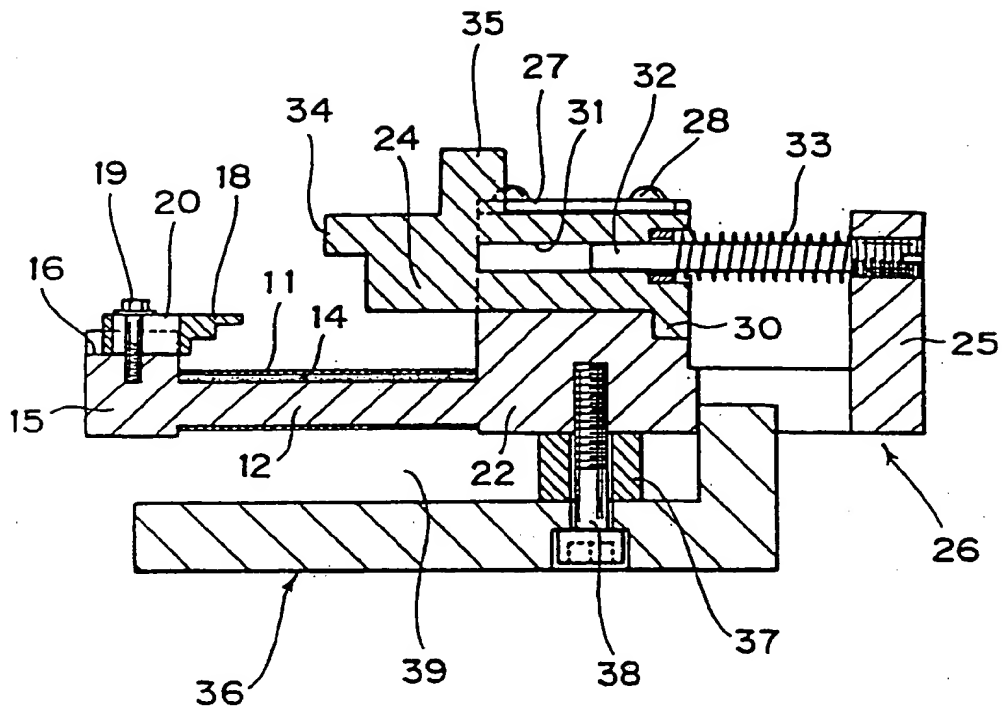


FIG. 4

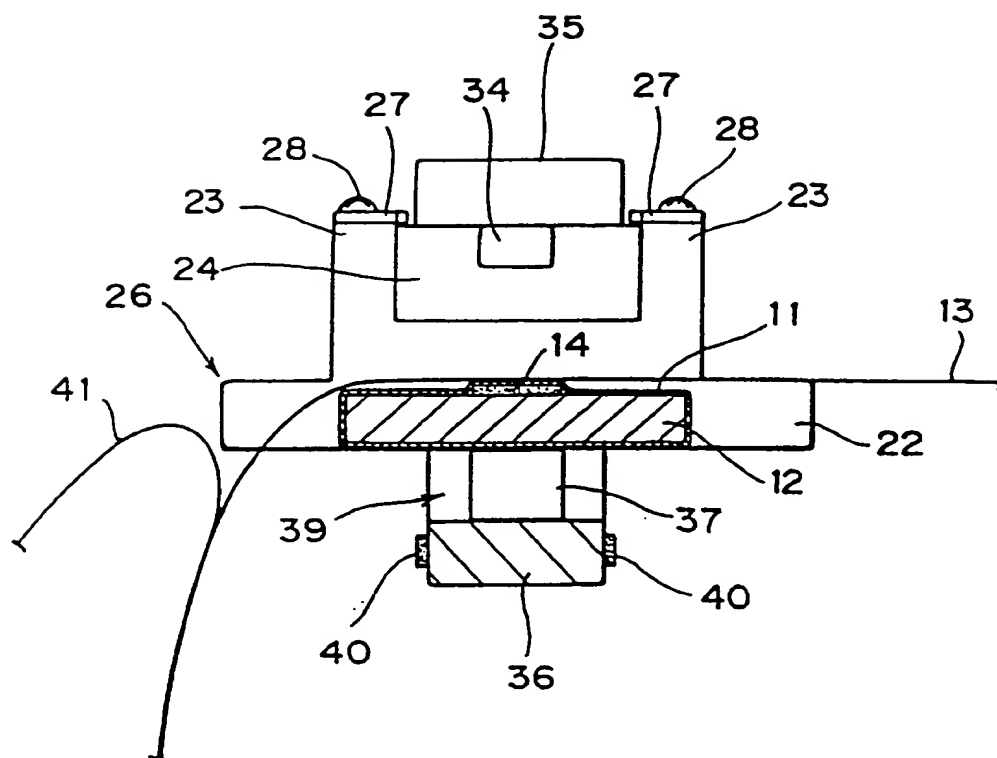


FIG.5

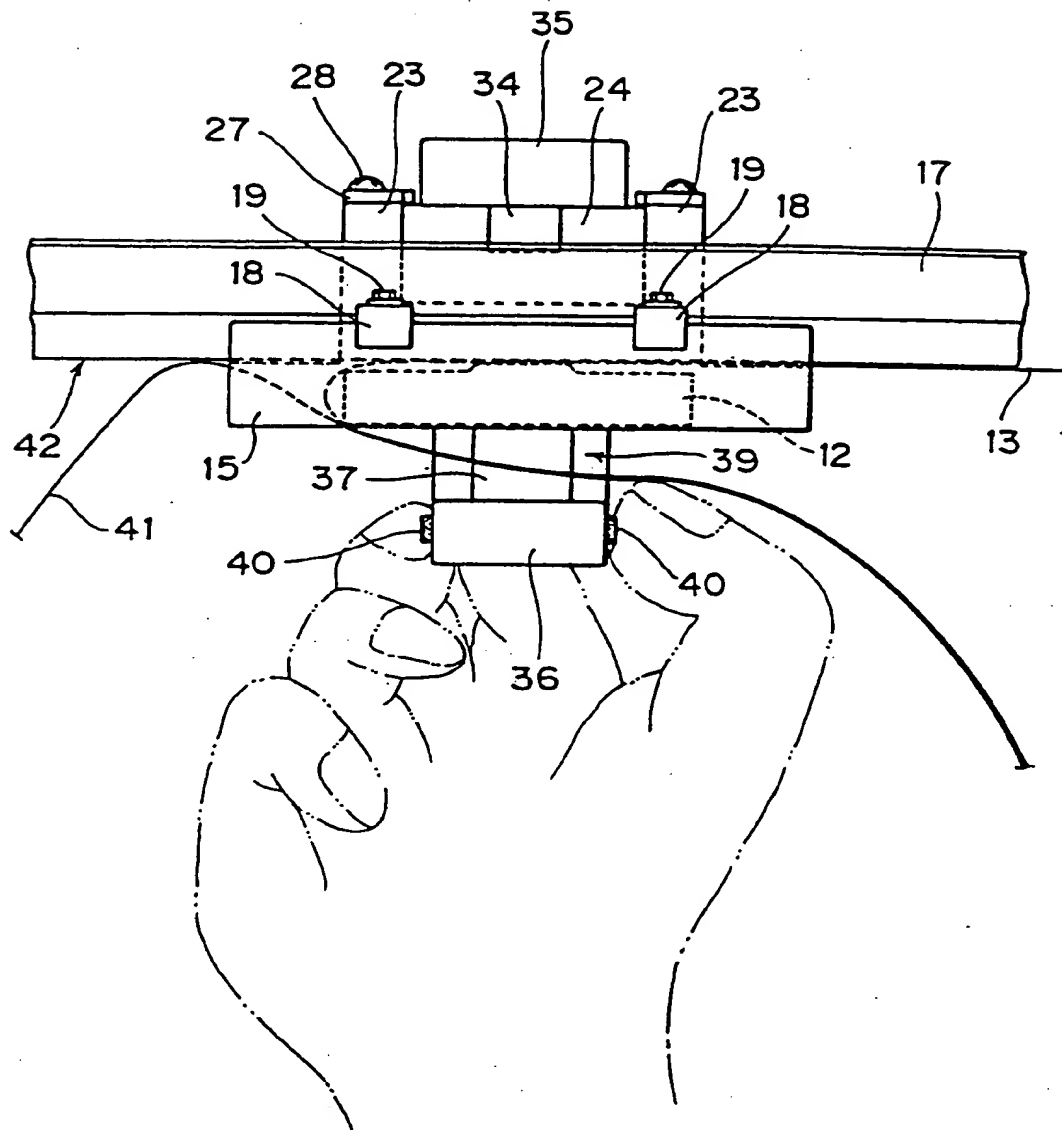


FIG. 6

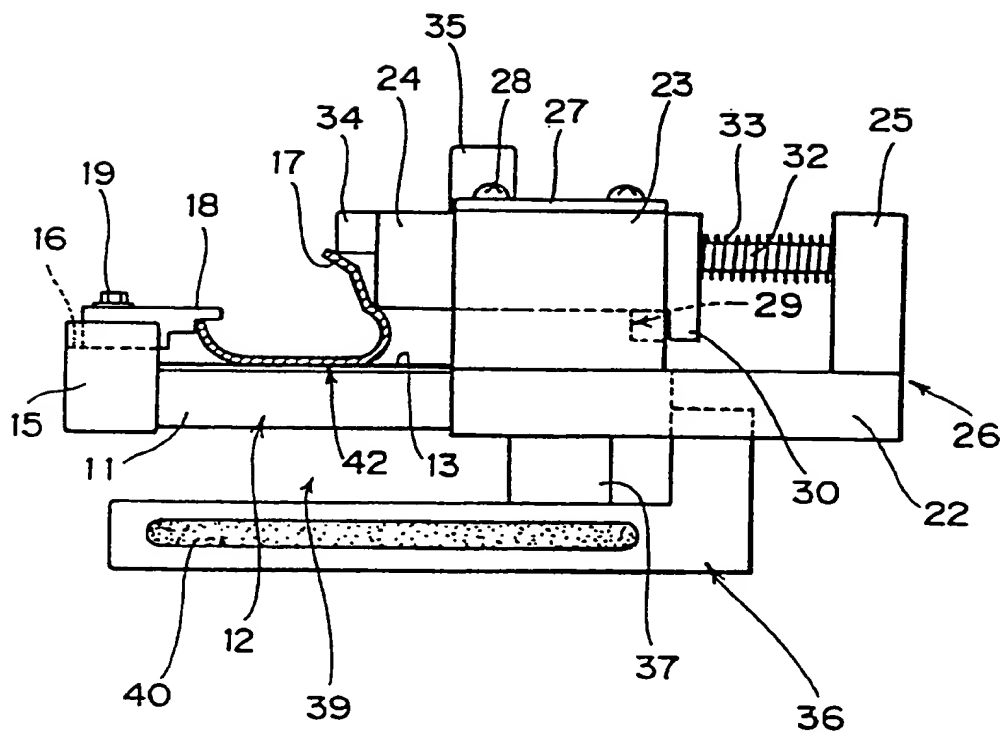


FIG. 7



## TAPE APPLICATION JIG

The present invention relates to a tape application jig peeling a strip form adhesive tape  
5 off a strippable base sheet and applying the adhesive tape on a tape applying surface formed on a work.

It is desirable to provide delustering black coating on the interior side of a door sash of an  
10 automotive vehicle, in view of the following reason. Namely, as viewed from the outside of the vehicle, particularly from the side of a vehicle body, clear external appearance of a overall vehicle body can be certainly provided by restricting reflection of a  
15 light at the interior side of the door sash.

For this purpose, it has been conventionally performed to perform spray painting of delustering black paint on the door sash portion. However, spray painting encounters various problems as requiring  
20 investment for additional facility for maintaining work environment good enough, taking a long period for drying paint, and so forth. As a solution for such drawback, Japanese Patent Application Laid-open No. 135015/1976 or Japanese Patent Application Laid-  
25 open No. 46780/1987 proposes application of delustering black adhesive tape having high weather resistance and high wear resistance on a door sash

portion, in place. In such case, as is well known, since the most part of the door sash portion of an automotive vehicle is consisted of three-dimensional curved portion, the above-mentioned adhesive tape application apparatus inherently becomes large scale. Also, when such adhesive tape application apparatus is installed in a practical production line, an investment for production line becomes huge. In addition, it has poor flexibility in adapting to modification of design of the door sash portion, and has poor general-purpose properties.

It can be considered that the operation for application of the adhesive tape is performed manually by the worker without using any jig. However, in order to accurately perform applying operation at a speed adapted to the production line of the automotive vehicle, quite high skill is required.

Thus, there has been proposed in Japanese Patent Application Laid-open No. 338627/1993, a tape applying jig which can easily and quickly perform application of the adhesive tape without requiring high skill of the worker. By employing the tape applying jig, the adhesive tape can be accurately applied at a predetermined position of the door sash portion easily and quickly without requiring high skill of the worker.

In the conventional tape application jig,  
disclosed in Japanese Patent Application Laid-open  
No. 338627/1993, there are right-cut jig and left-cut  
jig adapting to a right side door and a left side  
5 door of the automotive vehicle. Therefore, in case  
of sedan type passenger vehicle, for example, four  
kinds of tape application jig respectively for a left  
front door, a left rear door, a right front door and  
a right rear door have to be used selectively to make  
10 tape applying operation complicate and troublesome.

Also, when shape, such as width of the door sash  
portion and so forth in one model of the vehicle is  
modified, the tape application jig adapted to the  
modified shape has to be prepared at every occasion.  
15 Namely, the conventional tape application jig has  
quite poor flexibility in adapting to modification of  
the shape of the tape applying surface.

Therefore, it is an object of the present  
20 invention to provide a tape application jig which has  
high flexibility in adapting to the shape of tape  
applying surfaces and thus permits accurate  
application of an adhesive tape at predetermined  
positions on left and right door sash portions,  
25 easily and quickly without requiring highly skilled  
worker.

According to the present invention. a tape application jig for applying a strip form adhesive tape along a tape applying surface formed on a work with peeling the adhesive tape from a strippable

5 sheet, comprises:

a jig main body;

a tape guide portion provided on the jig main body opposing to the tape applying surface formed on the work, and passing the adhesive tape;

10 a pair of engaging means provided on the jig main body for slidably and detachably engaging the jig main body along the tape applying surface relative to the work; and

a tape pushing means formed in projecting  
15 condition of at least at the center portion of the tape guide portion along the longitudinal direction of the adhesive tape, in deformable fashion in a direction opposing to the tape applying surface for depressing the adhesive tape peeled off the  
20 strippable base sheet onto the tape applying surface.

Here, it is preferred that one of a pair of engaging means is mounted on the jig main body in relatively movable fashion in opposing direction to the other, and a biasing means for biasing one of the  
25 engaging means toward the other engaging means is disposed between the one of engaging means and the jig main body. In such case, it should be effective

that the other engaging means has a set of claw portions extending in parallel along the longitudinal direction of the strippable base sheet, and these claw portions are fixed in the jig main body via a position adjusting means for adjusting position in opposing direction to one of the engaging means.

On the other hand, it is preferred that the surfaces of the tape guide portion and the tape pushing means are coated with a member of low friction coefficient.

Also, at the opposite side of the tape guide portion, a handle portion for holding the jig main body may be provided. In such case, the handle portion may have a portion extending in parallel to a direction perpendicular to the longitudinal direction of the tape applying surface in spaced apart from the tape guide portion. It is further effective that the adhesive tape and the strippable base sheet before peeling off are past through in a gap between the handle portion and the tape guide portion.

Accordingly, the tip end portion of the adhesive tape is peeled off from the strippable base sheet, and then, the tip end portion of the adhesive tape is applied to the predetermined position of the tape applying surface. Thereafter, in order to overlap the tape guide portion of the jig main body and the portion of a tape applying surface, on which the tip

end portion of the adhesive tape is affixed, a pair of engaging means are operated to engage the jig main body to the work. By this, the tape pushing sheet is crushed by elastic deformation to place the adhesive  
5 tape depressed onto the tape applying surface.

At this condition, with peeling off the adhesive tape from the strippable base sheet, the jig main body is shifted along the tape applying surface. The adhesive tape which is restricted the offset relative  
10 to the tape applying surface, is depressed onto the tape applying surface associating with elastic deformation of the tape pushing sheet, and thus affixed onto the tape applying surface.

Here, one of a pair of engaging means is mounted  
15 on the jig main body in relatively movable fashion in the opposing direction to the other. When the biasing means biasing one engaging means toward the other engaging means is disposed between one engaging means and the jig main body, one of the engaging  
20 means is shifted in the opposing direction to the other engaging means following to fluctuation and variation of the width of the work. Thus, the jig main body can be engaged relative to the work constantly without play. On the other hand, when the  
25 width of the work is significantly differentiated, a gap between one set of claw portions as the other

engaging means and one engaging means can be appropriately operated by position adjusting means.

On the other hand, when the surface of the tape guide portion and the tape pushing means are coated  
5 by the member of low friction coefficient, friction resistance upon shifting of the jig main body along the tape applying surface of the work become smaller.

Furthermore, at the opposite side to the tape guide portion, by providing the handle portion for  
10 holding the jig main body, when a portion extending in parallel to a direction perpendicular to the longitudinal direction of the tape applying surface in spaced apart relationship to the tape guide portion across the gap, the adhesive tape and the  
15 strippable base sheet before peeling off passes through the gap between the handle portion and the tape guide portion, and the adhesive tape is peeled off the strippable base sheet and turned around toward the tape guide portion. Thus, only strippable  
20 base sheet is positioned at the front side in the shifting direction of the jig main body.

It should be noted that when the direction to pass the adhesive tape relative to the tape guide portion of the jig main body is reversed, the jig  
25 main body is shifted in reversed direction relative to the tape applying surface of the work.

By the tape application jig of the present invention, the direction to pass the adhesive tape has no directionality relative to the tape guide portion of the jig main body. Namely, along the  
5 longitudinal direction of the adhesive tape, the adhesive tape can pass the tape guide portion in either direction. Therefore, the jig can be used in either of left-cut and right-cut works.

On the other hand, one of a pair of engaging  
10 means is mounted on the jig main body in relatively movable fashion in the opposing direction to the other. When the biasing means biasing one engaging means toward the other engaging means is disposed between one engaging means and the jig main body, one  
15 of the engaging means is shifted in the opposing direction to the other engaging means following to fluctuation and variation of the width of the work. Thus, the jig main body can be engaged relative to the work constantly without play. As a result, even  
20 by not skilled worker, the adhesive tape can be applied accurately on the tape applying surface of the work. Furthermore, since the gap between one set of claw portion as the other engaging means and one engaging means can be adjusted by operating the  
25 position adjusting means, even when the width of the work is differentiated significantly, single tape application jig can be used with requiring only



adjustment. Also, adaptivity to variation of configuration of the work can be superior to that of the prior art.

Furthermore, when the surfaces of the tape guide  
5 portion and the tape pushing portion are coated with the member having low friction coefficient, frictional resistance in shifting of the jig main body along the tape applying surface of the work can be smaller to perform tape applying operation with  
10 smaller operation force.

On the other hand, when the handle for holding the jig main body is provided at the opposite side to the tape guide portion and a portion extending in parallel to the direction perpendicular to the  
15 longitudinal direction of the tape applying surface in spaced apart relationship with the tape guide portion, is provided in the handle portion, the adhesive tape and the strippable base sheet before peeling off can pass through the gap between the  
20 handle portion and the tape guide portion, and then the adhesive tape can be peeled off the strippable base sheet and turned around toward the tape guide portion. Therefore, in the front side of the shifting direction of the jig main body, only  
25 strippable base sheet is present to make it possible to improve workability.

The present invention will be understood more fully from the detailed description given herebelow and from the accompanying drawings of the preferred embodiment of the invention, which, however, should  
5 not be taken to be limitative to the present invention, but are for explanation and understanding only.

In the drawings:

Fig. 1 is a perspective view showing an external  
10 appearance of one embodiment of a tape application jig according to the present invention as applied for a front door inner sash portion of a passenger vehicle;

Fig. 2 is an exploded perspective view of the  
15 embodiment of the tape application jig shown in Fig. 1;

Fig. 3 is a plan view of the embodiment of the tape application jig shown in Fig. 1;

Fig. 4 is a section taken along line IV - IV of  
20 Fig. 3;

Fig. 5 is a section taken along line V - V of Fig. 3;

Fig. 6 is a front elevation of the embodiment of the tape application jig shown in Fig. 1, in a  
25 condition connected to a front door sash portion; and

Fig. 7 is a left side elevation of the embodiment of the tape application jig shown in Fig.

1, in a condition connected to a front door sash portion.

The present invention will be discussed  
5 hereinafter in detail in terms of the preferred  
embodiment of a tape application jig as applied for a  
front door sash portion of a passenger vehicle, with  
reference to Fig. 1 showing an external appearance,  
showing in exploded condition, Fig. 3 showing a plan  
10 view, Figs. 4 and 5 respectively showing sections  
taken along line IV - IV and line V - V, Fig. 6  
showing a front elevation in a condition connected to  
a front door sash portion, and Fig. 7 is a left side  
elevation thereof. In the following description,  
15 numerous specific details are set forth in order to  
provide a thorough understanding of the present  
invention. It will be obvious, however, to those  
skilled in the art that the present invention may be  
practiced without these specific details. In other  
20 instance, well-known structures are not shown in  
detail in order to unnecessary obscure the present  
invention.

Namely, a flat plate form tape guide portion 12  
which is coated with a member 11 of low friction  
25 coefficient, such as high density polyethylene sheet  
and so forth, has a width matching with a width  
(vertical length in Fig. 3) of an adhesive tape 13.

At the center portion of the tape guide portion 12 along the longitudinal direction (left and right direction in Fig. 3) of the adhesive tape 13, an elastically deformable tape pushing sheet 14 which is  
5 formed of a foamed polyurethane sheet or so forth is affixed in projected condition as a tape pushing means of the present invention. The tape pushing sheet 14 is in a condition coated by the member 11 of low friction coefficient set forth above.

10 On one edge of the tape guide portion 12 in width direction, an end block 15 contacting with one of side edges of the adhesive tape 15 is formed integrally. On the end block 15, a pair of front and rear side grooves 16 extending in parallel to each  
15 other are formed along width direction of the tape guide portion 12. In the pair of grooves 16, claw members 18 engaging to the outer side of a front door sash portion 17 are secured by means of a fastening bolt 19. A tip end portion of the claw member 18  
20 projected right above one end side of the tape guide portion 12.

In the shown embodiment, an elongated hole 20 is formed through the claw member 18 for extending the fastening bolt 19 therethrough, and a female thread  
25 bore 21 is formed in the bottom of the groove 16. By this, depending upon difference of dimensions of the front door sash portion 17 in the width direction,

the projecting position of the claw member 18 can be varied. These fastening bolt 19, the elongated hole 20 and the female thread bore 21 form a position adjusting means of the present invention.

5        On the other end of the tape guide portion 12 in width direction, a holder block 22 contacting with the other side edge of the adhesive tape 13, is formed integrally in opposition to the end block 15. On the holder block 22, a pair of front and rear  
10    guide walls 23 are extended in mutually parallel relationship to each other. Between these guide walls 23, a rectangular slide block 24 is disposed for sliding movement in a direction toward and away from the claw member 18. Also, at the end of the  
15    holder block 22 opposite to the side where the tape guide portion 12 is located, a guide bar holder 25 opposing to the slide block 24 is extended vertically.

It should be noted that a jig main body 26 in  
20    the shown embodiment is constructed with the end block 15, the holder block 22, the guide wall portion 23 and the guide bar holder 25.

At the upper end of the guide wall portion 23, a  
25    retainer plate 27 preventing the slide block 24 from upwardly loosening off from the guide wall portion 23, is secured by means of fastening screws 28. On the other hand, at the guide bar holder 25 side of the

slide block 24, a stopper portion 30 preventing the slide block from loosing off toward the end block 15 side by engaging with a stepped portion 29 formed at the center portion of the holder block 22, is  
5 extended downwardly. Furthermore, in the guide bar holder 25, base end portions of a pair of front and rear guide bars 32, tip end sides of which are slidably engaged with a pair of front and rear guide holes 31 formed in the slide block 24 in mutually  
10 parallel relationship along the width direction of the tape guide portion, are secured by means of screws. On these guide bars 32, a compression coil spring 33 is wound around at a position between the slide block 24 and the guide bar holder 25 for  
15 biasing the slide block 24 toward the end block 15.

Accordingly, the slide block 24 is biased toward the end block 15 by the spring force of the compression coil spring 33. Then, the slide block 24 may be shifted toward the guide bar holder 25 against  
20 the spring force of the compression coil spring 33.

On the end face of the slide block 24 at the end block 15 side, a projecting portion 34 which can engage with the inner side of the front door sash portion 17 and are cooperated with a pair of claw  
25 members 18 to be secured on the front door sash portion 17. By the claw members 18 and the projecting portion 34, the jig main body 26 can be

secured on the front door sash portion 17.

Furthermore, on the upper end of the slide block 24, a finger grip portion 35 for retracting the slide block 24 toward the guide bar holder 25 against the  
5 spring force of the compression coil spring 33, is extended upwardly.

At the center portion of the holder block 22, a base end portion of an L-shaped handle portion 36 extending in the width direction of the tape guide  
10 portion 12, is secured via a spacer 37 by means of a fastening bolt 38. Between the handle portion 36 and the tape guide portion 12, a gap 39 is formed. At both end faces of the handle portion 36, a slide stop rubber 40 is affixed.

15 Accordingly, upon practical operation, the tip end portion of the adhesive tape 13 is peeled off from a strippable base sheet 41. Then, the tip end portion of the adhesive tape 13 is applied to the predetermined position (generally, application start  
20 position) of a flat tape applying surface 42 of the front door sash portion 17. Thereafter, utilizing the fiber grip portion 35, the slide block 24 is peeled off from the claw members 18. Then, with maintaining this condition, in order to overlap the  
25 tape guide portion 12 of the jig main body 26 and a portion of a tape applying surface 42, on which the tip end portion of the adhesive tape is affixed, the

jig main body 26 is pressed onto the front door sash portion 17. Then, releasing the finger grip portion 35, by a spring force of the compression spring 33, the claw members 18 and the projecting portion 34 are  
5 engaged to the front door sash portion 17. By this, the tape pushing sheet 14 is crushed by elastic deformation to place the adhesive tape 13 depressed onto the tape applying surface 42.

At this condition, with peeling off the adhesive  
10 tape 14 from the strippable base sheet 41, the jig main body 26 is shifted toward left in Fig. 6 along the tape applying surface 42. By the tape guide portion 12, the adhesive tape 13 which is restricted the offset relative to the tape applying surface, is  
15 depressed onto the tape applying surface 42 associating with elastic deformation of the tape pushing sheet 14, and thus affixed onto the tape applying surface 42.

Here, the slide block 24 is constantly biased  
20 toward a pair of claw members 18 by the spring force of the compression spring 33. Therefore, following to fluctuation or variation of width of the front door sash portion 17, the slide block 24 is shifted toward and away from the claw members 18. In this result,  
25 with respect to the front door sash portion 17, the jig main body 26 is engaged to the front door sash portion 17 relative to the claw members 18, without



play. On the other hand, since the surfaces of the tape guide portion 12 and the tape pushing sheet are coated with the member of low friction coefficient, a frictional resistance when the jig main body 26 is shifted along the tape applying surface of the front door sash portion 17, becomes small to facilitate operation.

Thus, the adhesive tape 13 is applied on the tape applying surface 42 of the front door sash portion 17. Then, by employing a not shown squeezing roller, both end portions of the adhesive tape 13 in width direction is applied to the remaining portion of the front door sash portion 17. At this condition, since the position of the adhesive tape 13 relative to the front door sash portion 17 is already determined, operation can be easily without any problem.

It should be noted that the adhesive tape 13 and the strippable base sheet 41 may be placed at the front side in the forward direction, as shown in Fig. 5. In this case, as shown in Fig. 6, by turning the adhesive tape 13 around the tape guide portion 12 through a gap 39 between the handle portion 36 and the tape guide portion 12, the strippable base sheet 41 is placed at the front side of the shifting direction of the jig main body 26 to effectively improve operability.

On the other hand, the left and right front door sash portions 17 set forth above, are normally formed symmetrically relative to the body of the automotive vehicle. Depending upon left- and right-cut, the  
5 direction to pass the adhesive tape 13 relative to the tape guide portion 12 is reversed from the condition shown in Figs. 5 and 6, and the jig main body 26 relative to the tape applying surface 42 of the front door sash portion 17 is shifted in the  
10 reversed direction. Then, the jig main body can be used as is.

Furthermore, when the width and configuration of the front door sash portion 17 due to difference of the kind of vehicle is differentiated significantly,  
15 by loosening the fastening bolt 19 to appropriately shifting the positions of the claw members 18 and exchanging the claw members 18 and the slide block 24 to those of other configuration, the jig main body can be adjusted and matched thereto.

20 Although the invention has been illustrated and described with respect to exemplary embodiment thereof, it should be understood by those skilled in the art that the foregoing and various other changes, omissions and additions may be made therein and  
25 thereto, without departing from the spirit and scope of the present invention. Therefore, the present invention should not be understood as limited to the

specific embodiment set out above but to include all possible embodiments which can be embodied within a scope encompassed and equivalents thereof with respect to the feature set out in the appended  
5 claims.

CLAIMS:

1. A tape application jig for applying a strip form adhesive tape along a tape applying surface formed on  
5 a work with peeling the adhesive tape from a strippable sheet, characterized by comprising:
  - a jig main body;
  - a tape guide portion provided on said jig main body opposing to said tape applying surface formed on  
10 said work, and passing said adhesive tape;
  - a pair of engaging means provided on said jig main body for slidably and detachably engaging said jig main body along said tape applying surface relative to said work; and
  - 15 a tape pushing means formed in projecting condition of at least at the center portion of said tape guide portion along the longitudinal direction of said adhesive tape, in deformable fashion in a direction opposing to said tape applying surface for  
20 depressing said adhesive tape peeled off said strippable base sheet onto said tape applying surface.
2. A tape application jig as claimed in claim 1,  
25 characterized in that one of a pair of engaging means is mounted on said jig main body in relatively movable fashion in opposing direction to the other,

and a biasing means for biasing one of said engaging means toward the other engaging means is disposed between said one of engaging means and said jig main body.

5

3. A tape application jig as claimed in claim 2, characterized in that the other engaging means has a set of claw portions extending in parallel along the longitudinal direction of said strippable base sheet,  
10 and these claw portions are fixed in said jig main body via a position adjusting means for adjusting position in opposing direction to one of said engaging means.

15 4. A tape application jig as claimed in claim 1, characterized in that the surfaces of said tape guide portion and said tape pushing means are coated with a member of low friction coefficient.

20 5. A tape application jig as claimed in claim 1, characterized in that, at the opposite side of said tape guide portion, a handle portion for holding said jig main body is provided.

25 6. A tape application jig as claimed in claim 5, characterized in that said handle portion has a portion extending in parallel to a direction

perpendicular to the longitudinal direction of said tape applying surface in spaced apart from said tape guide portion.

7. A tape application jig as claimed in claim 6, characterised in that said adhesive tape and said strippable base sheet before peeling off are past through in a gap between said handle portion and said tape guide portion.

8. A tape application jig substantially as hereinbefore described and with reference to any one of Figs. 1 to 7.

**Amendments to the claims have been filed as follows**

1. A tape application jig for applying an adhesive tape to a work surface comprising:  
a jig main body;  
a tape guide means for guiding the tape with respect to the jig main body;  
characterised by:  
engaging means disposed on the jig main body for slidably gripping the work surface; and  
tape pushing means for urging the tape against the work surface, which work surface is slidably held in position by the engaging means.
2. A tape application jig of claim 1 wherein the engaging means comprises a pair of complimentary engaging elements.
3. A tape application jig of claim 2 wherein a first engaging part is movable relative to the jig main body and a second engaging element, and said first engaging element is biased towards said second engaging element.
4. A tape application jig of claim 3 wherein the second engaging element comprises two members extending towards the first engaging element and normally to the longitudinal axis of the tape; and  
said two members are adjustable towards and away from said first engaging element.
5. A tape application jig of any preceding claim wherein said tape guide means and said tape pushing means are coated with a material of low friction coefficient.

6. A tape application jig as claimed in any preceding claim further comprising a handle disposed on the jig main body adjacent an opposite side to the tape guide means.
7. A tape application jig as claimed in any preceding claim wherein the handle comprises a member spaced apart from the jig main body and co-axial with the longitudinal axis of the jig main body.
8. A tape application jig of claim 7 wherein, in use, the adhesive tape has a strippable backing and both the adhesive tape and the backing are passed between the handle and the jig main body.
9. A tape application jig of any preceding claim wherein the tape pushing means comprises a ridge formed in the tape guide means projecting outwardly from the tape guide means.
10. A tape application jig substantially as hereinbefore described and with reference to and as illustrated in the accompanying drawings.





Application No: GB 9615866.2  
 Claims searched: 1-8

Examiner: Stephen Smith  
 Date of search: 9 October 1996

# Patents Act 1977 Search Report under Section 17

## Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): B8F

Int CI (Ed.6): B65H 35/07, 37/04

Other: ONLINE:WPI

## Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	WO 93/09050 A1 (MINNESOTA) deformable tape pushing means 21, engaging means 82 (lines 19-38 of page 12)	1 at least
X	US 4818329 (TUTAS) deformable tape pushing means 36 (lines 1-16 of column 6), engaging means 47-50 (lines 9-15 of column 5)	1 at least
X	US 3935758 (POLZIN) deformable tape pushing means 50, engaging means 44 (lines 23-31 of column 3, lines 2-9 of column 4)	1 at least

X Document indicating lack of novelty or inventive step  
 Y Document indicating lack of inventive step if combined with one or more other documents of same category.  
 & Member of the same patent family

A Document indicating technological background and/or state of the art.  
 P Document published on or after the declared priority date but before the filing date of this invention.  
 E Patent document published on or after, but with priority date earlier than, the filing date of this application.

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